AGENDA
CALIFORNIA TRAFFIC CONTROL DEVICES COMMITTEE (CTCDC)
March 25, 2005 Meeting
Caltrans District 11, 2829 Juan Street (Auditorium), San Diego, CA 92110
TIME 9:00 AM

ORGANIZATION ITEMS

1. **Introduction**
2. **Approval of Minutes (December 8, 2004 Meeting)**
3. **Election**
4. **Public Comments**
   At this time, members of the public may comment on any item not appearing on the agenda. Matters presented under this item cannot be discussed or acted upon by the Committee at this time. For items appearing on the agenda, the public is invited to make comments at the time the item is considered by the Committee. Any person addressing the Committee will be limited to a maximum of five (5) minutes so that all interested parties have an opportunity to speak. When addressing Committee, please state your name, address, and business or organization you are representing for the record.

AGENDA ITEMS

5. **Public Hearing**
   Prior to adopting rules and regulations prescribing uniform standards and specifications for all official traffic control devices placed pursuant to Section 21400 of the California Vehicle Code (CVC), the Department of Transportation is required to consult with local agencies and hold public hearings.

03-3	Tsunami Evacuation Signing (National Weather)	(Continued) (Meis)
04-13	Older Californian Traffic Safety Task Force (Proposal to Amend MUTCD 2003 Section 4E.10)	(Continued) (Meis)
04-15	Older California Traffic Safety Task Force Proposal to Amend MUTCD Sections 2B.33, 2B.34, 2B.35, 2B.37, 2B.38 4D.10 and 4E.10	(Continued) (Meis)

6. **Request for Experimentation**

04-6	Proposed School Bus Sign, “Do not Pass Stopped School Bus Flashing Red Lights” Increased Fines Apply CVC 22454.5 (Experiment Agency – County of Ventura)	(Continued) (Babico)
05-1	Experiment with a Pedestrian Enhanced Delineation System (by using in-roadway warning lights) for Crosswalks at the Signalized Intersection. (Experiment Request by the City of Pasadena)	(Introduction) (Bahadori)

04-11	Bicycle May Use Full Lane (The City of Santa Cruz Requested to Remove Item from Agenda)	(Continued) (Borstel)
	Pedestrian Countdown Signal Heads (Recommendation to Close Items 01-3, 01-7, 02-2, 02-4 Pending Under Experimentation)	(Continued) (Meis)

7. Discussion Items

04-E	Combining of the MUTCD 2003 & CA Supplement to a single document	(Continued) (Fisher)
04-G	Overhead Pedestrian/School Crosswalk Signing with Yellow Flashing Beacons	**(**Continued) **(**Babico)
05-2	MUTCD Section 1A.03 (Discussion on option which allows agencies to develop word message sign with out experimentation)	(Introduction) (Meis)
05-3	Parking Restrictions at Intersections (CA Supplement Section 3B.18) (Request from City of San Francisco)	(Introduction) (Meis)

8 Information Items

05-4	Older California Traffic Safety Task Force Proposal to Amend MUTCD Sections 3D.03, 6F.58 thru 6F.61, 6F.63, 6F.65, 6F.81, 6F.85, 6G.15 and 6G.16 and Notes to TA's 39, 40, 41 and 45.	(Introduction) (Meis)

9. Next Meeting

10. Adjourn

ITEM UNDER EXPERIMENTATION

99-12 Speed Striping For Smart Crosswalks **(**Meis)
(Experiment Agency-Caltrans D7)
Status: No update

99-13 Illuminated Pavement Markers On Median Barriers (Meis)
(Experiment Agency-Caltrans D7)
Status: The project has not been funded yet.

01-3 Pedestrian Countdown Signal Heads
(Fisher)
(Citywide Experiment request by the City of Fountain Valley)
Status: The City has submitted their final report to the Committee and has received approval to expand the experimentation as a citywide.

01-4 Tactile Pedestrian Indicator With Audible Information (Tanda)
(Experiment request by the City of Santa Cruz)
Status: No update.

01-7 Pedestrian Countdown Signal Heads (Tanda)
(Experiment Agency-City of Oakland)
Status: The city has received approval from the FHWA and working to acquire funds in the FY 2002-03 budget.

01-9 IN-ROADWAY WARNING LIGHTS AT R/R CROSSINGS (Meis)
(Experiment requests by CPUC in cooperation Kern Co. & City of Fresno)
Status: CPUC is in process to hire consultant firm to conduct a study.

02-2 Pedestrian Countdown Signal Heads (Tanda)
(Experiment Agency-City of Berkeley)
Status: No update.

02-4 Pedestrian Countdown Signal Heads (Larsen)
(Experiment request by the County of San Luis Obispo)
Status: No update

02-15 Radar Guided Dynamic Curve Warning System (Meis)
(Experimentation Agency – Caltrans D5)

03-1 Speed Feedback (Radar Speed) Sign (Fisher)
(Experimentation Agency – City of Whittier)

03-4 Radar Speed Sign (Borstel)
(Experiment Agency – City of Vacaville)

03-5 Radar Speed Sign (Borstel)
(Experiment Agency – City of San Mateo

03-6 Radar Speed Sign (Borstel)
(Experiment Agency – City of San Jose)

Status: City of San Jose planned to conduct the study next fall for the school radar signs that San Jose installed this past fall.

03-13	Variable Speed Limit Sign (Experiment Request by the City of Campbell)	(Borstel)
03-14	Numbering of Signalized Intersections (Experiment Request by the CVAG)	(Babico)
03-15	Radar Speed Sign (Experiment Request by the City of Freemont)	(Borstel)
04-9	Request to Experiment with “Watch The Road” Sign (Experiment Agency – Los Angles DOT)	(Bahadori)
04-10	Slow for the Cone Zone Sign (Experiment Agency – Caltrans)	(Meis)
04-12	Requests for experimentation with "Flashing Yellow Arrows" (Experiment Agency – City of Fullerton and Pasadena)	(Bahadori)

STATUS OF CALTRANS ACTION ON PAST ITEMS

Item 01-1 U-TURN SIGNAL HEADS INDICATOR
Caltrans will develop appropriate standards to ensure visibility and make the U-turn signal head indicator an official traffic control device by inclusion in the Caltrans Supplement.

Item 00-4 USE OF RAISED PAVEMENT MARKERS IN TRANSVERSE PATTERN
Caltrans will take appropriate action on the recommendation made by the Committee.

Item 02-3 RIGHT EDGELINE
Caltrans will take appropriate action on the recommendation made by the Committee.

03-3 Tsunami Evacuation Signing P 1 of 12

The Department of Transportation, State of Oregon, uses the following policy and practice to place Tsunami Evacuation signing:

1.0 TSUNAMI SIGN PLACEMENT GUIDELINES

Tsunamis are usually generated by great subduction zone earthquakes when the ocean floor is rapidly uplifted during the earthquake. The tsunami wave from a local subduction zone earthquake will arrive at the coast in approximately 15-30 minutes, and tsunami waves will continue to arrive periodically for several hours. When the shaking stops, people must immediately move inland and to high ground. It is critical that residents and tourists know where the tsunami hazard zones, evacuation routes and safe zones are located along the coast.

The most visible way to educate the public about them is to post signs. There are several tsunami signs available: tsunami hazard zone, tsunami evacuation route, tsunami evacuation site, and entering/leaving tsunami hazard zone. All these signs were created in Oregon. The tsunami hazard zone and evacuation route signs have been adopted for use by the Pacific states of the National Tsunami Hazard Mitigation Program steering group (Alaska, California, Hawaii, Oregon, and Washington). Other Pacific Rim countries have also either adopted or adapted the signs for their use.

To insure consistency of sign placement, the following guidelines were developed for each of the signs.

Installation of tsunami signs on state highways must be approved and coordinated with the Oregon Department of Transportation (ODOT). Government entities can order all signs from the ODOT Sign Shop (503-986-2805). Also contact ODOT for guidelines on sign installation (post size, attachment methods, etc.).

Contact Oregon Emergency Management (503-378-2911) for further information on sign placement.

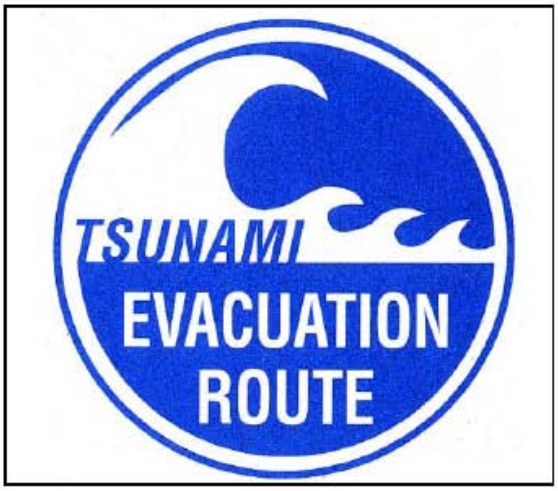
2.0 TSUNAMI HAZARD ZONE

This sign should be placed at locations within the tsunami hazard zone as defined by local evacuation maps, detailed tsunami inundation maps or, if these are not available, tsunami hazard maps used to implement Oregon Revised Statutes 455.446 and 445.447. The statutes limit construction of critical and essential structures in the mapped tsunami inundation zone.

The sign comes in two sizes: 22" x 18" and 30" x 24". The size needed depends on where you plan to install the sign. It is important that the sign be visible, especially when located in areas where many people congregate (beaches, parks, and developed waterfronts).

3.0 TSUNAMI EVACUATION ROUTE

This sign should be placed along roads designated as tsunami evacuation routes that take people out of the tsunami hazard zone. Evacuation routes are identified by local governments.



At present the sign comes in two sizes: 18" and 24" in diameter. Due to Federal Standards, ODOT will no longer make the round signs.

Instead, the sign will be square with the round evacuation route design inside it. It is important that the sign be visible; thus the larger sign may be warranted in some situations.

The sign is available with the wave curling to the right or left. This allows the breaking wave to always point to high ground regardless of the side of the road the sign is located on.

It is recommended that an arrow sign be used in conjunction with the evacuation route sign to insure that people go in the right direction. The orientation of the arrow sign with respect to the evacuation route sign may vary. The following orientations are acceptable: 1) the arrow sign is pointing skyward with the evacuation route sign above it and both signs are perpendicular to the evacuation route, 2) both the evacuation route sign and arrow sign below it are parallel to the route, and 3) the evacuation route sign is perpendicular to the route and the arrow sign below it is parallel. In orientations 1 and 2, the arrow sign is the determiner of the direction of evacuation and not the curl of the wave. The arrow sign may also be placed above the evacuation route sign.

NOTE: Theft is a major problem with tsunami signs. The evacuation route sign on the uppermost left above contains two tamper proof screws. Tamper proof screws are recommended for all tsunami signs to prevent theft. Although these screws do not guarantee that signs will not be stolen (sometimes the whole post is pulled up), they have proven to be an effective deterrent.

4.0 TSUNAMI EVACUATION SITE

This sign can be placed in the tsunami safe zone indicating that people do not need to go further inland or uphill. It could also be placed at a pre-designated destination or assembly area where there are emergency supplies and/or shelter.

This sign also comes in two sizes: 18" x 22" and 24" x 30". Once again the sign should be visible so choose the right sized sign for the location.

5.0 ENTERING AND LEAVING TSUNAMI HAZARD ZONE

These signs should be placed on major state or county roads where the road enters and leaves the tsunami hazard zone. They should be placed on both sides of the road and at both ends of the specific stretch of road within the tsunami hazard zone. However, if the road dead ends, then signs need only be placed at one end where people are entering and leaving, such as a State Park.

The signs come in one size: 42″ x 48″ so it can be visible by motorists traveling at highways speeds.

6.0 EXAMPLES OF PROPER PLACEMENT OF HAZARD ZONE SIGN AND EVACUATION ROUTE SIGNS

Rockaway Beach: Hazard zone and evacuation route signs at the corner of Hwy 101 and 3rd Avenue.

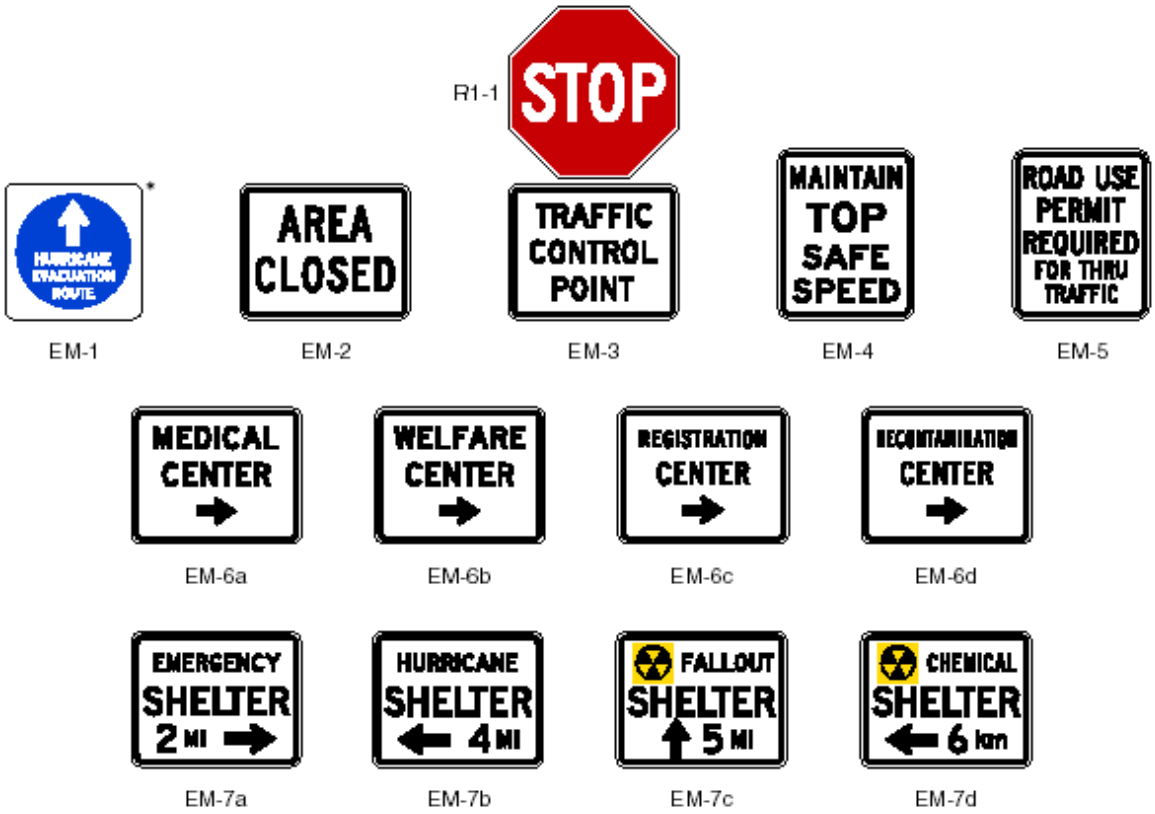
The location of the sign is in the tsunami inundation zone and the evacuation route sign wave is curled in the uphill direction. The hazard zone sign curl is in the opposite direction but mirror image signs are not available for hazard zone signs.

Cannon Beach: Evacuation route signs at the corner of S. Hemlock and Sunset Boulevard. Note that the curl of the wave is in the uphill direction.

Cannon Beach: Evacuation route sign at the corner of Sunset Boulevard and S. Spruce. Note that in this sign orientation the arrow sign is the determiner of the direction of evacuation, not the curl of the wave on the evacuation route sign.

The MUTCD 2003 recommend using following signs in a case of emergency evacuation. P 9 of 12

Figure 2I-1. Emergency Management Signs



* HURRICANE is an example of one type of evacuation route. Legends for other types may also be used, or this line of text may be omitted.

Section 2I.03 EVACUATION ROUTE Sign (EM-1)

Standard:

The EVACUATION ROUTE (EM-1) sign (see Figure 2I-1) shall be a rectangular sign with a blue circular symbol with a directional arrow and the legend EVACUATION ROUTE. The diameter of the circular symbol shall be 25 mm (1 in) smaller than the width of the sign.

Option:

An approved Emergency Management symbol may appear near the bottom of the sign with a diameter of 87 mm (3.5 in).

Standard:

The legend and arrow of the EVACUATION ROUTE sign shall be white on a blue circular background. The corners of the sign outside of the circle shall be white. The entire sign shall be retroreflective. The arrow designs shall include a straight, vertical arrow pointing upward, a straight horizontal arrow pointing to the left or right, or a bent arrow pointing to the left or right for advance warning of a turn.

If used, the EVACUATION ROUTE sign, with the appropriate arrow, shall be installed 45 to 90 m (150 to 300 ft) in advance of, and at, any turn in an approved evacuation route. The sign shall also be installed elsewhere for straight-ahead confirmation where needed.

If used in urban areas, the EVACUATION ROUTE sign shall be mounted at the right-hand side of the roadway, not less than 2.1 m (7 ft) above the top of the curb, and at least 0.3 m (1 ft) back from the face of the curb. If used in rural areas, it shall be not less than 2.1 m (7 ft) above the pavement and 1.8 to 3 m (6 to 10 ft) to the right side of the roadway edge.

EVACUATION ROUTE signs shall not be placed where they will conflict with other signs. Where conflict in placement would occur between the EVACUATION ROUTE sign and a standard regulatory sign, the regulatory sign shall take precedence.

Option:
The legend on the EVACUATION ROUTE sign may be modified to describe the type of evacuation route, such as HURRICANE.
In case of conflict with guide or warning signs, the Emergency Management sign may take precedence.

Guidance:
Placement of EVACUATION ROUTE signs should be made under the supervision of the officials having jurisdiction over the placement of other traffic signs. Coordination with Emergency Management authorities and agreement between contiguous political entities should occur to assure continuity of routes.

Option:
The arrow may be a separate panel attached to the face of the sign.

Section 2I.04 AREA CLOSED Sign (EM-2)

Standard:
The AREA CLOSED (EM-2) sign (see Figure 2I-1) shall be used to close a roadway in order to prohibit traffic from entering the area. It shall be installed on the shoulder as near as practical to the right edge of the roadway, or preferably, on a portable mounting or barricade partly or entirely in the roadway.

Guidance:
For best visibility, particularly at night, the sign height should not exceed 1.2 m (4 ft) from the pavement to the bottom of the sign. Unless adequate advance warning signs are used, it should not be placed to create a complete and unavoidable blocked route. Where feasible, the sign should be located at an intersection that provides a detour route.

Section 2I.05 TRAFFIC CONTROL POINT Sign (EM-3)

Standard:
The TRAFFIC CONTROL POINT (EM-3) sign (see Figure 2I-1) shall be used to designate a location where an official traffic control point has been set up to impose such controls as are necessary to limit congestion, expedite emergency traffic, exclude unauthorized vehicles, or protect the public. The sign shall be installed in the same manner as the AREA CLOSED sign (see Section 2I.04), and at the point where traffic must stop to be checked.

The standard STOP (R1-1) sign shall be used in conjunction with the TRAFFIC CONTROL POINT sign. The TRAFFIC CONTROL POINT sign shall consist of a black legend and border on a retroreflectorized white background.

Guidance:
The TRAFFIC CONTROL POINT sign should be mounted directly below the STOP sign.

Section 2I.06 MAINTAIN TOP SAFE SPEED Sign (EM-4)

Option:
The MAINTAIN TOP SAFE SPEED (EM-4) sign (see Figure 2I-1) may be used on highways where conditions are such that it is prudent to evacuate or traverse an area as quickly as possible.

Where an existing Speed Limit (R2-1) sign is in a suitable location, the MAINTAIN TOP SAFE SPEED sign may conveniently be mounted directly over the face of the speed limit sign that it supersedes.

Support:
Since any speed zoning would be impractical under such emergency conditions, no minimum speed limit can be prescribed by the MAINTAIN TOP SAFE SPEED sign in numerical terms. Where traffic is supervised by a traffic control point, official instructions will usually be given verbally, and the sign will serve as an occasional reminder of the urgent need for maintaining the proper reasonably safe speed.

Guidance:
The sign should be installed as needed, in the same manner as other standard speed signs.

Standard:
If used in rural areas, the MAINTAIN TOP SAFE SPEED sign shall be mounted on the right side of the road with its lower edge not less than 1.5 m (5 ft) above the pavement, 1.8 to 3 m (6 to 10 ft) from the roadway edge. If used in urban areas, the height shall be not less than 2.1 m (7 ft), and the nearest edge of the sign shall be not less than 0.3 m (1 ft) back from the face of the curb.

Section 2I.07 ROAD (AREA) USE PERMIT REQUIRED FOR THRU TRAFFIC Sign (EM-5)

Support:
The intent of the ROAD (AREA) USE PERMIT REQUIRED FOR THRU TRAFFIC (EM-5) sign (see Figure 2I-1) is to notify road users of the presence of the traffic control point so that those who do not have priority permits issued by designated authorities can take another route, or turn back, without making a needless trip and without adding to the screening load at the post. Local traffic, without permits, can proceed as far as the traffic control post.

Standard:
If used, the ROAD (AREA) USE PERMIT REQUIRED FOR THRU TRAFFIC (EM-5) sign shall be used at an intersection that is an entrance to a route on which a traffic control point is located. If used, the sign shall be installed in a manner similar to that of the MAINTAIN TOP SAFE SPEED sign (see Section 2I.06).

Section 2I.08 Emergency Aid Center Signs (EM-6 Series)

Standard:
In the event of emergency, State and local authorities shall establish various centers for civilian relief, communication, medical service, and similar purposes. To guide the public to such centers a series of directional signs shall be used.
Emergency Aid Center (EM-6 series) signs (see Figure 2I-1) shall carry the designation of the center and an arrow indicating the direction to the center. They shall be installed as needed, at intersections and elsewhere, on the right side of the roadway, at a height in urban areas of at least 2.1 m (7 ft), and not less than 0.3 m (1 ft) back from the face of the curb, and in rural areas at a height of 1.5 m (5 ft), 1.8 to 3 m (6 to 10 ft) from the roadway edge.
Emergency Aid Center signs shall carry one of the following legends, as appropriate, or others designating similar emergency facilities:

A. MEDICAL CENTER (EM-6a)

B. WELFARE CENTER (EM-6b) P 12 of 12
C. REGISTRATION CENTER (EM-6c)
D. DECONTAMINATION CENTER (EM-6d)

The Emergency Aid Center sign shall be a horizontal rectangle. The identifying word and the word CENTER, the directional arrow, and the border shall be black on a white background.

Section 2I.09 Shelter Directional Signs (EM-7 Series)

Standard:
Shelter Directional (EM-7 Series) signs (see Figure 2I-1) shall be used to direct the public to selected shelters that have been licensed and marked for emergency use.
The installation of Shelter Directional signs shall conform to established highway signing standards. Where used, the signs shall not be installed in competition with other necessary highway guide, warning, and regulatory signs.
The Shelter Directional sign shall be a horizontal rectangle. The identifying word and the word SHELTER, the directional arrow, the distance to the shelter, and the border shall be black on a white background.

Option:
The distance to the shelter may be omitted from the sign when appropriate.
Shelter Directional signs may carry one of the following legends, or others designating similar emergency facilities:
A. EMERGENCY (EM-7a)
B. HURRICANE (EM-7b)
C. FALLOUT (EM-7c)
D. CHEMICAL (EM-7d)
If appropriate, the name of the facility may be used.
The Shelter Directional signs may be installed on the Interstate Highway System or any other major highway system when it has been determined that a need exists for such signs as part of a State or local shelter plan.
The Shelter Directional signs may be used to identify different routes to a shelter to provide for rapid movement of large numbers of persons.

Guidance:
The Shelter Directional sign should be used sparingly and only in conjunction with approved plans of State and local authorities.
As a general rule, the Shelter Directional sign should not be posted more than 8 km (5 mi) from a shelter.

04-13 Older Californian Traffic Safety Task Force, Proposal to Amend MUTCD 2003 Section 4E.10 P 1 of 2

During the last CTCDC meeting Committee requested to "Older Californian Traffic Safety Task Force" provide traffic studies prepared by Los Angeles and Australia to members for review, which recommended that the older pedestrians walk distance should be considered 2.8 feet per seconds for walk phase.

The documents submitted by the "Older Californian Traffic Safety Task Force" are attached under a separate file name, "Ped-Walk-Time –Study." The Task Force has revised the proposed text under guidance as underlined in Italic.

Recommendation #62 (I.P.(1))

Section 4E.10 Pedestrian Intervals and Signal Phases

Existing MUTCD Section 4E.10 text (Keep existing MUTCD text and add proposed CA Supp text):

Guidance:

Where pedestrians who walk slower than 1.2 m (4 ft) per second, or pedestrians who use wheelchairs, routinely use the crosswalk, a walking speed of less than 1.2 m (4 ft) per second should be considered in determining the pedestrian clearance time.

Proposed CA Supplement Section 4E.10 text (Add proposed text in addition to the above MUTCD text):

Guidance:

Where older pedestrians routinely use the crosswalk, a walking speed of 0.85 m (2.8 ft) per second should be considered in determining the pedestrian clearance time, *unless an engineering study justifies a different walking speed.*

Background:

To accommodate the shorter stride and slower gait of less capable (15th percentile) older pedestrians, and their exaggerated "start-up" time before leaving the curb, pedestrian control-signal timing based on an assumed walking speed of 0.85 m/s (2.8 ft/s) is recommended.

Rationale P 2 of 2

A nationwide review of fatalities during the year 1985, and injuries during the period of 1983–1985, showed that 39 percent of all pedestrian fatalities and 9 percent of all pedestrian injuries involved persons age 64 and older. While the number of injuries is close to the population distribution (approximately 12 percent), the number of fatalities far exceeds the proportion of older pedestrians. The percentages of pedestrian fatalities and injuries occurring at intersections were 33 percent and 51 percent, respectively. (Hauer, 1988)

Diminished Capability

Age-related diminished capabilities, which may make it more difficult for older pedestrians to negotiate intersections, include decreased contrast sensitivity and visual acuity, reduced peripheral vision and "useful field of view," decreased ability to judge safe gaps, slowed walking speed, and physical limitations resulting from arthritis and other health problems.

Older pedestrian problem behaviors include a greater likelihood to delay before crossing, to spend more time at the curb, to take longer to cross the road, and to make more head movements before and during crossing (Wilson and Grayson, 1980).

Supporting Evidence

Older pedestrian walking speed has been studied by numerous researchers. Hoxie and Rubenstein (1994) measured the crossing times of older and younger pedestrians at a 21.85-m (71.69-ft) wide intersection in Los Angeles, CA, and found that older pedestrians (age 65 and older) took significantly longer than younger pedestrians to cross the street. In this study, the average walking speed of the older and younger pedestrians was 0.86 m/s (2.8 ft/s) and 1.27 m/s (4.2 ft/s), respectively.

Another effort was conducted at two crosswalk locations at two intersections in Sydney, Australia (a major 6-lane divided street, and a side street), where the design crossing speed was changed from 1.2 m/s to 0.9 m/s (4.0 ft/s to 3.0 ft/s) (Job, Haynes, Quach, Lee, and Prabhaker, 1994). Observations were made during 3,242 crossings during a baseline period (1.2 m/s [4.0 ft/s] design crossing speed) and 2 and 6 weeks after the flashing DON'T WALK interval was extended to allow for the slower crossing speed under study. The authors note that the assumed walking speed of 1.2 m/s (4.0 ft/s) leaves almost 15 percent of the total population walking below the assumed speed. Extending the clearance interval resulted in a decrease in the percentage of pedestrian-vehicle conflicts, from 4 percent in the baseline period to 1 percent in the experimental period at 2 weeks and also 1 percent at 6 weeks, at the wider intersection. At the conclusion of this research, the authors recommended a reduction in the design walking speed from 1.2 m/s to 0.9 m/s (4.0 ft/s to 3.0 ft/s) at locations where there is significant usage by older pedestrians.

Relationship to Other Guides

Section 4E.10 of the MUTCD suggests the use of 1.2 m (4 ft) per second as the normal walking speed for establishing the pedestrian clearance interval. However, it is noted that slower speeds may be used where routine users include slower pedestrians or pedestrians in wheelchairs.

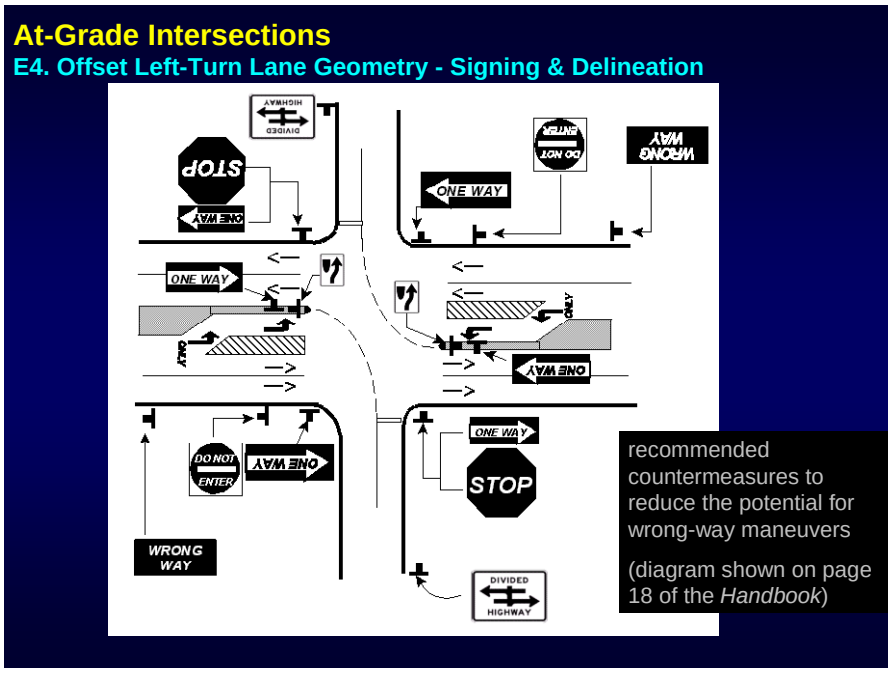
It is also noted as an option that passive pedestrian detection equipment may be used to extend the clearance interval for slower pedestrians. More information on the technology available for this application can be found at www.walkinginfo.org/pedsmart.

04-15 Older California Traffic Safety Task Force Proposal to Amend MUTCD Sections 2B.33, 2B.34, 2B.35, 2B.37, 2B.38, 4D.10 and 4E.10 P 1 of 5

Recommendation #16 (I.E.(4a))

Section 2B.33 Keep Right and Keep Left Signs (R4-7, R4-8)
Section 2B.34 DO NOT ENTER Sign (R5-1)
Section 2B.35 WRONG WAY Sign (R5-1a)
Section 2B.37 ONE WAY Signs (R6-1, R6-2)
Section 2B.38 Divided Highway Crossing Signs (R6-3, R6-3a)

Proposed CA Supplement text to be added to the above Sections:
Guidance:
At intersections where the left-turn lane treatment results in channelized offset left-turn lanes (e.g., a parallel or tapered left-turn lane between two medians), the size of the Keep Right (R4-7), DO NOT ENTER (R5-1), WRONG WAY (R5-1a), ONE WAY (R6-1, R6-2), or Divided Highway Crossing (R6-3, R6-3a) signs, if used, should be oversized (larger than Table 2B-1 specified standard sizes for conventional roadways) to reduce the potential for wrong-way maneuvers by drivers turning left from a stop-controlled, intersecting minor roadway.



Rationale
Concerns raised about the potential for wrong-way maneuvers when offset left-turn lanes are used may justify the need to add appropriate signs and markings to eliminate such behaviors.

Diminished Capability
Reduced visual acuity and contrast sensitivity make it more difficult to detect appropriate lane boundaries. Diminished physical strength may make path following tasks through an intersection more difficult.

Supporting Evidence
The potential for wrong-way maneuvers when using offset turn lanes was raised by a panel of older driver and highway design experts in two different studies (Staplin et al., 1997; Harwood et al., 1995).

Other studies examining the causes of wrong way maneuvers suggested the recommendations noted above in items "a" through "f" (Scifres and Loutzenheiser, 1975; Parsonson and Marks, 1979).

Recommendation #58 (I.N.(2))

Section 4D.10 Yellow Change and Red Clearance Intervals

Proposed CA Supplement text to be added to this Section:

Guidance:

To accommodate age differences in perception-reaction time, an all-red clearance interval should be consistently implemented, with length determined according to the Institute of Transportation Engineers (1992) expressions given below**:**

a) Where pedestrian traffic is prohibited, or no pedestrian crossing facilities are provided, use:

$$r = (W + L)/V$$

b) Where pedestrian crossing facilities are provided, use:

$$r = (P + L)/V$$

Where: r = length of red clearance interval, to the nearest 0.1 s.
W = width of intersection (m [ft]), measured from the near-side stop line to the far edge of the conflicting traffic lane along the actual vehicle path.
P = width of intersection (m [ft]), measured from the near-side stop line to the far side of the farthest conflicting pedestrian crosswalk along the actual vehicle path.
L = length of vehicle (recommended as 6 m [20 ft]).
V = speed of the vehicle through the intersection (m/s [ft/s]).

Rationale

Standards for traffic signals are important because it is imperative that they attract the attention of every driver, including older drivers and those with impaired vision who meet legal requirements, as well as those who are fatigued or distracted, or who are not expecting to encounter a signal at a particular location. It is also necessary for traffic signals to meet motorists' needs under a wide range of conditions including bright sunlight, nighttime, in adverse weather, and in visually cluttered surroundings.

It is generally agreed that the visibility issues associated with circular signals relate to the following factors: minimum daytime intensity, intensity distribution, size, nighttime intensity, color of signals, backplates, depreciation (light loss due to lamp wear and dirt on lenses), and phantom (apparent illumination of a signal in a facing sun).

Diminished Capability

Available evidence suggests that older individuals have reduced levels of sensitivity to intensity and contrast, but not to color. Older drivers need increased levels of signal luminance and contrast in certain situations to perceive traffic signals as efficiently as 20- to 25-year-old drivers.

Supporting Evidence

Traffic signal recommendations for different sizes, colors, and in-service requirements have, in large part, been derived analytically from one research study conducted by Cole and Brown (1966). The conclusion of this laboratory study was that a red signal with an intensity of 200 cd should invoke a "certain and rapid response" from an observer viewing the signal at distances up to 100 m (328 ft) even under extremely bright ambient conditions.

Fisher and Cole (1974) cautioned against using a value less than 200 cd, to ensure that older drivers and drivers with abnormal color vision will see the signal with certainty and with "reasonable speed."

Two studies have examined the PRT value used to calculate the amber signal phase timing. One effort concluded that the value be increased from 1.0 sec (current standard) to 1.5 sec to accommodate older drivers (Tarawneh, 1991). The other found no differences in older and younger drivers decision/response times and concluded no change was needed in the amber timing variables. Without more definitive evidence, no change is recommended in the PRT value used for amber timings. However, the second recommendation above for an all-red clearance interval will provide additional response time for those older drivers needing it.

Relationship to Other Guides

Warrants for traffic signals are thoroughly described in the MUTCD. The decision to install a traffic signal is based on an investigation of physical and traffic flow conditions and data, including traffic volume, approach travel speeds, physical condition diagrams, crash history, and gap and delay information (Wilshire, 1992).

The MUTCD incorporates the intensity, light distribution, and chromaticity standards from the following Institute of Transportation Engineers (ITE) standards for traffic signals: Vehicle Control Signal Heads, ITE Standard No ST-008B (ITE, 1985b); Pedestrian Traffic Control Signal Indications, ITE Standard No. ST-011B (ITE, 1985a); Traffic Signal Lamps, ITE Standard No. ST-010 (ITE, 1986); and Lane-Use Traffic Control Signal Heads (ITE, 1980).

The ITE standard provides different recommendations for each of the three colors for each signal size. The recommendations are as follows: for red, 157 cd for 200-mm (8-in) signals and 399 cd for 300-mm (12-in) signals; for green, 314 cd for 200-mm (8-in) signals and 798 cd for 300-mm (12-in) signals; and for yellow, 726 cd for 200-mm (8-in) signals and 1,848 cd for 300-mm (12-in) signals.

Recommendation #67 (I.P.(6))

Section 4E.10 Pedestrian Intervals and Signal Phases

Proposed CA Supplement text to be added to this Section:

Guidance:

At intersections with high pedestrian volumes, high turning-vehicle volumes, and no turn on red (NTOR) control for traffic moving parallel to a marked crosswalk, a leading pedestrian interval (LPI), timed to allow slower walkers to cross at least one moving lane of traffic should be used to reduce conflicts between pedestrians and turning vehicles. The length of the LPI, which should be at least 3 s, should be calculated using the formula:

LPI = (ML + PL)/2.8

Where:
LPI = seconds between onset of the WALK signal for pedestrians and the green indicator for vehicles.
ML = width of moving lane in ft.
PL = width of parking lane (if any) in ft.
2.8 = walking speed in ft/s.

Rationale

A nationwide review of fatalities during the year 1985, and injuries during the period of 1983–1985, showed that 39 percent of all pedestrian fatalities and 9 percent of all pedestrian injuries involved persons age 64 and older. While the number of injuries is close to the population distribution (approximately 12 percent), the number of fatalities far exceeds the proportion of older pedestrians. The percentages of pedestrian fatalities and injuries occurring at intersections were 33 percent and 51 percent, respectively. (Hauer, 1988)

Diminished Capability

Age-related diminished capabilities, which may make it more difficult for older pedestrians to negotiate intersections, include decreased contrast sensitivity and visual acuity, reduced peripheral vision and "useful field of view," decreased ability to judge safe gaps, slowed walking speed, and physical limitations resulting from arthritis and other health problems.

Older pedestrian problem behaviors include a greater likelihood to delay before crossing, to spend more time at the curb, to take longer to cross the road, and to make more head movements before and during crossing (Wilson and Grayson, 1980).

Slower walking speeds of older pedestrians results in more time required crossing the often large intersections where channelization is likely to be present. In addition, the diminished reaction time of older pedestrians may not allow them to react to turning vehicles as quickly and avoid a conflict or collision.

Supporting Evidence

One strategy that in recent implementations has appeared to offer promise in assisting pedestrians who are slower or more reluctant to cross when there is a perceived likelihood of conflict with turning vehicles is the leading pedestrian interval (LPI). A LPI is a brief, exclusive signal phase dedicated to pedestrian traffic. Van Houten, Retting, Farmer, and Van Houten (1997) investigated the effects of a 3-s LPI on pedestrian behavior and conflicts with turning vehicles at three urban intersections in St. Petersburg, FL.

The likelihood of conflict was significantly lower during the LPI condition than during the baseline condition for both left- and right-turning vehicles; the odds of conflict for pedestrians leaving the curb during the begin-walk period were reduced by approximately 95 percent. The reduction in odds conflict for seniors as a function of an LPI phase (89 percent reduction) was not significantly different from that of their younger counterparts (97 percent reduction). There was no significant effect of LPI on the odds of conflict for pedestrians leaving the curb after the begin-walk period, indicating that an LPI does not move conflicts to a later phase in the WALK interval.

04-6 Proposed School Bus Sign, "Do Not Pass Stopped School Bus Flashing Red Lights" Increased Fines Apply CVC 22454.5

During the August 2004 CTCDC meeting Committee requested that the County consider collecting before data which would include violations and other efforts such as enforcement and education, then bring that information back to the Committee. In addition, the County should conduct a safety investigation as justification for the proposal. A motion was passed requesting to the County of Ventura first try other avenues such as education and enforcement. If the problem still exists, then come back to the Committee with justification for the experiment.

The county has submitted following support letters in favor of the experiment request.

county of ventura

PUBLIC WORKS AGENCY
RONALD C. COONS
Agency Director

Transportation Department
Wm. Butch Britt, Director
Central Services Department
Lane B. Holt, Director
Water & Sanitation Department
R. Reddy Pakala, Director
Watershed Protection District
Jeff Pratt, Director
Engineering Services Department
Alec T. Pringle, Director

December 20, 2004

Jacob Babico
Chief-Traffic Division
San Bernardino County
Transp. & Flood Control Dept.
825 E. 3rd St., Room 115
San Bernardino, CA 92415-0835

SUBJECT: PROPOSED SCHOOL BUS SIGN

Dear Mr. Babico:

At its meeting on August 12th, 2004 in San Diego, the CTCDC considered a request from the Ventura County Transportation Department to install the attached sign on Santa Rosa Road to discourage drivers from passing stopped school buses with their flashers turned on in violation of the California Vehicle Code. A copy of our original request dated May 18, 2004 is attached. Committee members requested that data be provided to confirm that there were significant numbers of violations occurring.

Letters were sent out to the Santa Rosa Valley Municipal Advisory Committee, the California Highway Patrol, the Automobile Club of Southern California and the Pleasant Valley School District, which serves the Santa Rosa Valley community. The attached three responses were received. Although this is not the specific data requested, it does support the installation of the requested sign on a trial basis. The specific data requested does not exist in any regularly maintained data base nor may any such data be gathered without costly monitoring and methodology.

It would be appreciated if you could bring this item back to the CTCDC at its first available meeting in 2005 requesting that the Committee either approve the use of the sign for a trial period or deny the request.

Very truly yours,

Wm. Butch Britt
Director
Transportation Department

A#74\wbb-229.doc:sa
Enclosures
C: Devinder Singh, Supervisor Linda Parks, Nazir Lalani

county of ventura

PUBLIC WORKS AGENCY
RONALD C. COONS
Agency Director

Transportation Department
Wm. Butch Britt, Director
Water Resources & Development Department
John C. Crowley, Director
Central Services Department
Lane B. Holt, Director
Environmental & Energy Resources Department
Kay Martin, Director
Watershed Protection District
Jeff Pratt, Director
Engineering Services Department
Alec T. Pringle, Director

May 18, 2004

Jacob Babico
Chief-Traffic Division
San Bernardino County
Transp. & Flood Control Dept.
825 E. 3rd St., Room 115
San Bernardino, CA92415-0835

SUBJECT: PROPOSED SCHOOL BUS SIGN

Dear Mr. Babico:

The Ventura County Transportation Department requests that you serve as sponsor for our proposal to install school bus signs along a six-mile stretch of Santa Rosa Road at the request of the Santa Rosa Valley residents in Ventura County. The residents would like the sign installed at regular intervals to remind drivers that they are required to stop when traveling in either direction. Drivers frequently fail to do so. The California Highway Patrol has limited resources to conduct enforcement on Santa Rosa Road. The signs are part of an effort to educate drivers to comply with the provisions of the California Vehicle Code.

A layout of the proposed sign was developed in order to present this concept to CTCDC. A sample is enclosed. The size of the sign will be 36" by 48" along the horizontal axis. Although the exact color scheme has not been determined, it is our intention to use something very similar to the color scheme shown on the attached sample, which was based on a sign used in the Province of Ontario in Canada. However, we would welcome any suggestions that the CTCDC may offer. The signs would be installed outside the paved shoulders of Santa Rosa Road at approximately 1-mile intervals. There would be a total of ten signs installed, five for each direction of traffic.

We appreciate your willingness to be the sponsor. It would be appreciated if you could confirm the August 12 date for the next CTCDC meeting in San Diego. I plan to attend the meeting and will need to know the time and location.

If you have questions, you may contact me at (805) 654-2077 or Nazir Lalani at (805) 654-2080.

Very truly yours,

Wm. Butch Britt
Director
Transportation Department

A#74\nl-246.doc:sa

Enclosure

C: Devinder Singh, Department of Transportation
Supervisor Linda Parks
Nazir Lalani

Santa Rosa Valley Municipal Advisory Council

Rosemary Allison, Mark Burley, Janis Gardner, Ruth Means, Don Shubert

December 9, 2004

RE: School bus passing signs

California Traffic Control Devices Committee

Members of the California Traffic Control Devices Committee,

The purpose of this letter is to urge you to approve the school bus signs created by the Department of Public Works of the County of Ventura for installation along Santa Rosa Road.

These signs are necessary for the protection and safety of the children that utilize the school buses along this route. Some drivers do not seem to know that it is illegal to pass a stopped bus with red lights flashing. These signs will help in the enforcement of the Vehicular Code of California in this area.

The children's many school bus stops are on both sides of Santa Rosa Road, which is a very busy undivided road with a speed limit of 55 m.p.h. There is no barrier between the bus stops and where the children exit and the road itself. Therefore, when children leave the bus they walk on a dirt shoulder next to road itself.

The CHP unfortunately does not have the manpower to consistently enforce the law. Many of the vehicles simply do not stop when the school bus lights are flashing. Suffice it to say, it is extremely dangerous for the children.

Educating the public is the overall purpose for the signs and we are hopeful vehicles will stop when they are made aware that there are penalties involved for breaking this law.

Thank you for your consideration on this matter.

Rosemary Allison

Rosemary Allison
Chair-Santa Rosa Valley Municipal Advisory Council

Ventura County Supervisor Linda Parks, District 2
(805) 373-2564 email: Linda.Parks@mail.co.ventura.ca.us
Access to MAC minutes at agendas at:
http://www.countyofventura.org/bos/dist2.asp

State of California—Business, Transportation and Housing Agency ARNOLD SCHWARZENEGGER, Governor

DEPARTMENT OF CALIFORNIA HIGHWAY PATROL
4656 Valentine Road
Ventura, CA 93003
(805) 477 4100
(800) 735-2929 (TT/TDD)
(800) 735-2922 (Voice)

WBB
NL
file

September 21, 2004

File No.: 765.11748.13407

Wm. Butch Britt, Director
County of Ventura
Transportation Department
800 S. Victoria Ave.
Ventura, CA 93009

Dear Mr. Butch Britt:

Your request was received in regards to school bus traffic enforcement on Santa Rosa Road. A traffic enforcement matrix was obtained for violations that occurred from September 1, 2003 to August 31 2004. The matrix indicates 54 citations were issued for passing violations during this time period. During this same period, no traffic collisions involving school buses occurred on Santa Rosa Road. The California Highway Patrol (CHP) shares the safety concerns with the residents of Santa Rosa Valley. The CHP is making every effort to increase enforcement in the area and educate drivers in regards to school bus safety.

Sincerely,

A. L. Stalk For

D.W. BOWER, Captain
Commander
Ventura Area

RECEIVED
SEP 29 2004
PWA - Transportation

Pleasant Valley School District

600 Temple Avenue, Camarillo, CA 93010-4835
(805) 482-2763

September 16, 2004

Wm. Butch Britt
Director, Transportation
County of Ventura
Hall of Administration L# 1600
800 S. Victoria Ave.
Ventura, CA 93009

Dear Mr. Britt,

I am in receipt of your letter of August 19, 2004 related to the proposed school bus signs along Santa Rosa Road. The Pleasant Valley School District fully supports the placement of appropriate signage along this roadway reminding drivers of the requirement to stop for school buses when the bus flashers are activated.

As you know, California law requires all vehicles to stop behind or before passing a school bus when the red lights flash. The flashing lights indicate that students are either boarding or exiting the bus. Your letter indicated that the CTCDC has requested any relevant data or observations about violation rates on Santa Rosa Road. It is our experience that violations of this law are numerous. Our bus drivers report that it occurs almost daily. However, we have no statistics as to the actual number of vehicles that pass our buses. The violations are so "plentiful", it would be virtually impossible for a bus driver to monitor student safety while counting the vehicles passing through the red lights. Our first priority is always the student safety.

The district does have a number of bus stops along Santa Rosa where we pick children up in the morning and bring them home in the afternoons. Any measure that will make motorists more aware of school bus activity would be appreciated. Questions regarding district transportation may be directed to Jan Maez, Assistant Superintendent, Fiscal and Administrative Services at (805) 445-8628.

Sincerely,

Thomas R. Dase

Thomas R. Dase, Ed.D.
Superintendent

Cc: J. Maez. Asst. Superintendent, PVSD
R. Riley, Director of TCS, PVSD

RECEIVED
SEP 20 2004
PWA - Transportation

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05-1 Experiment with a Pedestrian Enhanced Delineation System (by using in-roadway warning lights) for crosswalks at the signalized intersection. P 1 of 5

DEPARTMENT OF TRANSPORTATION

February 18, 2005

Hamid Bahadori, P. E., T. E.
Principal Transportation Engineer
Automobile Club of Southern California
333 Fairview Road, Suite A131
Costa Mesa, California 92626

RE: Pedestrian Enhanced Delineation System (PEDS) – Request for Experimentation

Dear Mr. Bahadori:

The City of Pasadena is requesting the California Traffic Control Devices Committee (CTCDC) approval to implement an experiment with a **Pedestrian Enhanced Delineation System (PEDS)** for crosswalks at the signalized intersection of Arroyo Parkway and Fillmore Street.

Background

The City of Pasadena is currently involved in the design development of the City's Arroyo Parkway Streetscape Enhancement Project. The goal of the project is to improve mobility, enhance the streetscape of Arroyo Parkway, and enhance the delineation of the pedestrian crosswalk lines through the application of technology to increase pedestrian compliance and increase the visibility of the crosswalks to pedestrians. The intersection of Arroyo Parkway and Fillmore Street is located midway along the City's project and is controlled with a traffic signal and pedestrian crosswalks. The Gold Line Light Rail Transit (LRT) Fillmore Station is located on the west side of the street and the crosswalks are used by pedestrians from the area's residential land uses on the east side of the street to access the light rail station for trips to Los Angeles or other
areas.

Need for Crosswalk Enhancement

The Gold Line LRT started operation in Pasadena in July 2003. The intersection of Arroyo Parkway and Fillmore Street was signalized in advance if the Gold Line opening to provide a safe crossing for pedestrians using the intersection to access the Gold Line LRT station. While the traffic signal provides adequate safety features for pedestrians, the City's goal is to provide additional enhancements to the crosswalks to promote the use of the crosswalks, increase the visibility of the crosswalk lines to pedestrians especially during night time hours, and increase the pedestrians' compliance with the pedestrian signal indications.

Relation to MUTCD

The 2003 Manual on Uniform Traffic Control Devices (MUTCD) Chapter 4L provides Support, Standard and Guidance for application of "In-Roadway Lights." While this chapter references the applicability of these devices to warn "road users", the intent of the chapter appears to focus on warning "motorists" using the roadway. This chapter does not specifically address how and if the "In-Roadway Lights" may be used to warn "pedestrians" of specific conditions.

Scope of the Experimentation

This experiment will install in-pavement lights outside the borders of crosswalk lines at the signalized intersection of Arroyo Parkway and Fillmore Street leading to one of the City's Gold Line LRT stations. Attachments 1 and 2 illustrate the location and concept for the in pavement lights at the subject intersection.

This experiment is focused only on "enhancing pedestrian markings" and as such, the in-pavement lights will be installed in such a way to only be directed along the crosswalk lines towards pedestrians, not towards the approaching traffic.

The in-pavement lights will be connected to and synchronized with the pedestrian signal indications at the intersection, and will be operated in the following fashion:

- During the pedestrian **WALK** interval, the in pavement lights will be turned on to **SOLID WHITE**

- During the pedestrian **FLASHING DON'T WALK** interval, the in-pavement lights will be turned on to **FLASHING YELLOW**

- During the pedestrian **DON'T WALK** interval, two options may be available:

  a) The in pavement lights will be turned on to **SOLID YELLOW**

  b) The in pavement lights will be turned **OFF** or remain **DARK**, until the next possible pedestrian actuation

Duration of Experiment

The City of Pasadena requests a 3-year demonstration for this experiment. The project may be terminated according to the CTCDC's "Guidelines for Experimentation with Traffic Control Devices."

Evaluation Procedure

The City of Pasadena will conduct BEFORE and AFTER studies to measure the effectiveness of the proposed experiment. The studies will include pedestrian counts, pedestrian compliance during the WALK and FLASHING DON'T WALK intervals, pedestrian violations during the DON'T WALK interval, as well as the motorists' compliance or violation of pedestrians' right of way during the WALK and FLASHING DON'T WALK intervals. The studies will also include an overall qualitative statement about the effectiveness of the proposed Pedestrian Enhanced Delineation System.

Reporting

City of Pasadena will provide the CTCDC with periodic status reports on the experimentation in accordance with the Committee's "Guidelines for Experimentation with Traffic Control Devices."

Administration

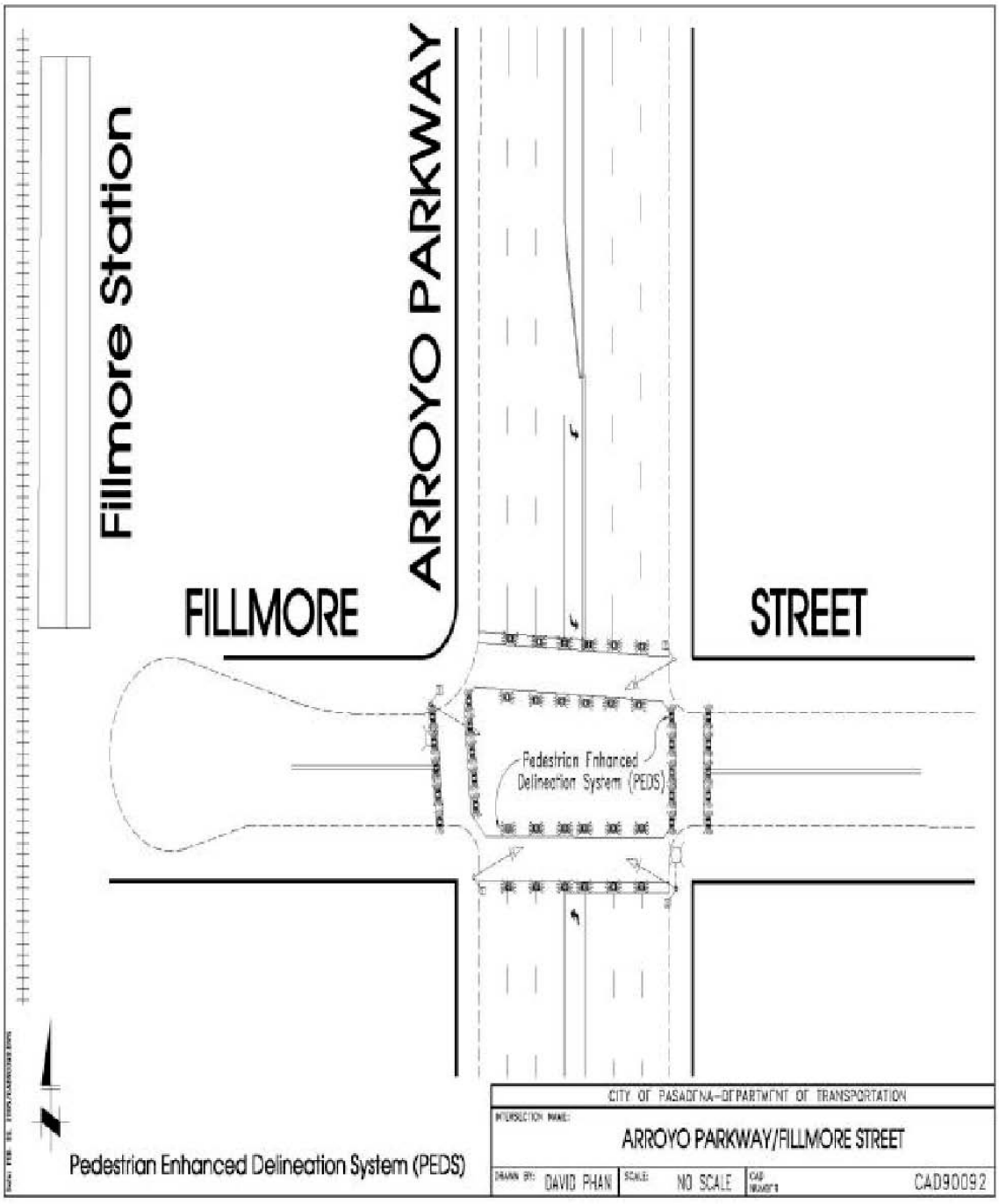
City of Pasadena will be responsible for administering this experiment under the direction of Bahman Janka, P.E., Transportation Administrator, located at 221 East Walnut Street, #210, Pasadena, California 91101.

We appreciate the CTCDC's consideration of our request and look forward to receiving the committee's permission to experiment with this operation, thereby improving the visibility and effectiveness of the painted crosswalks at this important link to the City's Gold Line Light Rail station.

Please feel free to call me if you have any questions regarding our request.

Respectfully,

Bahman Janka, P.E.
Transportation Administrator
(626) 744-4610
bjanka@ci.pasadena.ca.us



ATTACHMENT 1

ATTACHMENT 2

04-11 Bicycle May Use Full Lane

The City of Santa Cruz has requested to remove their experiment request with “Bicycle May Use Full Lane” from the CTCDC agenda.

Discussion Items

04-E Combining of the Two Documents to a Single Document

Caltrans will introduce the combined single-document version of Part 6 – Temporary Traffic Control of the MUTCD 2003 and the California Supplement for the Committee's consideration. Due to the large size of the document, it will be handed out during the meeting.

04-G Overhead Pedestrian/School Crosswalk Signing with Yellow Flashing Beacons

Here's the Background: There are several installation of Overhead Flashing Yellow Beacons (OFYB) at the painted crosswalks for Pedestrians and/or Schools. Every OFYB installation consists of a Pole, Mast arm, W66 sign, and a Flashing light on each side of the sign mounted on the mast arm.

The current policy requires Assembly B which consists of similar sign and the single downward arrowhead be installed at the nearest location to the crosswalk.
How can rectify the situation? The answer to that probably would be to add installation of Assembly B to the nearest crosswalk.

05-2 MUTCD Section 1A.03 (Discussion on option which allows agencies to develop word message sign with out experimentation)

CA Supplement has adopted the MUTCD option in this section which allows agencies to use any word messages on signs without the need for experimentation. Color, shape and symbols require FHWA experimentation and the State do not have the authority to develop these as they are FHWA standards. FHWA gives the option for word message signs, does the State want to restrict this option? In other words, can agencies create their own word message signs without any approval or standardization by the CTCDC or they should seek approval from the CTCDC to create their own messages? The currently approved policy does not require agencies to seek approval from CTCDC for any word message signs, like "Engine Brake". In the interest of uniformity, a standard message that could be applied elsewhere may need to be standardized versus a street name or place name or distance. For example, we do not want agencies to use "Photo Enforced", "Camera Enforced", "Video Enforced", etc. Another example is "FLOODED", "SUBJECT TO FLOODING", "PERIODICALY FLOODED", "SPOT FLOODING", etc.

05-3 Parking Restrictions at Intersections (CA Supplement Section 3B.18) P 1 of 1

SAN FRANCISCO DPT DEPARTMENT OF PARKING & TRAFFIC

GAVIN NEWSOM, MAYOR
BOND M. YEE, ACTING EXECUTIVE DIRECTOR

City and County of San Francisco

February 11, 2005

Devinder Singh, Secretary
California Traffic Control Devices Committee-MS36
P.O. Box 942874
Sacramento, CA 94274-0001

Re: Parking Restrictions at Intersections, Alleys and Driveways

Dear Mr. Singh:

The purpose of this letter is to reiterate San Francisco's concerns for the parking restrictions required in the 2003 California Supplement to the Manual on Uniform Traffic Control Devices (MUTCD). It is our hope that these concerns will be placed on an agenda and addressed at the next CTCDC meeting.

Section 3B18 of the Supplement required that "At all intersections, one stall length on each side measured from the crosswalk or end of curb return shall have parking prohibited. A clearance of 1.8 m. (6 ft.) measured from curb return shall be provided at alleys and driveways.

It is our opinion that the above requirements place an unreasonable liability and financial burden on all California agencies. Compliance with these requirements will result in the loss of a great number of parking spaces, a particular concern for denser urbanized areas. We recommend that this entire section be revised to match the language in the previous Traffic Manual, which suggested ("should") but did not require parking restrictions at intersections and driveways.

Thank you for the opportunity to communicate our concerns on this matter. If you have any questions, please call Ricardo Olea of my staff at 554-2310.

Sincerely,

Bond M. Yee
Acting Executive Director

c: Johnny Bhullar, Caltrans Division of Traffic Operations, P.O. Box 942874, Sacramento, CA 94274

BMY:JLF:RO:cm
042889b

Information Items

05-4 Older California Traffic Safety Task Force Proposal to Amend MUTCD Sections 3D.03, 6F.58 thru 6F.61, 6F.63, 6F.65, 6F.81, 6F.85, 6G.15 and 6G.16 and Notes to Typical Application's 39, 40, 41 and 45.

Recommendation #109 (IV.C.(1a))

Section 6F.59 Cones

Existing MUTCD Section 6F.59 text (Keep existing MUTCD text and add proposed CA Supp text):
Standard:
For daytime and low-speed roadways, cones shall be not less than 450 mm (18 in) in height. When cones are used on freeways and other high-speed highways or at night on all highways, or when more conspicuous guidance is needed, cones shall be a minimum of 700 mm (28 in) in height.

Proposed CA Supplement Section 6F.59 text (Add proposed text in addition to the above MUTCD text):
Guidance:
Cones should be a minimum of 900 mm (36 in) in height.

Existing MUTCD Section 6F.59 text (Keep existing MUTCD text and add proposed CA Supp text):
Standard:
Retroreflectorization of cones that are more than 900 mm (36 in) in height shall be provided by horizontal, circumferential, alternating orange and white retroreflective stripes that are 100 to 150 mm (4 to 6 in) wide. Each cone shall have a minimum of two orange and two white stripes with the top stripe being orange. Any nonretroreflective spaces between the orange and white stripes shall not exceed 75 mm (3 in) in width.

Proposed CA Supplement Section 6F.59 text (Add proposed text in addition to the above MUTCD text):
Guidance:
Retroreflectorization of cones that are more than 900 mm (36 in) in height should be provided with a retroreflective material totaling at least 300 mm (12 in) wide at night.

Recommendation #110 (IV.C.(1b))

Section 6F.60 Tubular Markers

Existing MUTCD Section 6F.60 text (Keep existing MUTCD text and add proposed CA Supp text):
Standard:
Tubular markers (see Figure 6F-7, Sheet 1 of 2) shall be predominantly orange and shall be not less than 450 mm (18 in) high and 50 mm (2 in) wide facing road users. They shall be made of a material that can be struck without causing damage to the impacting vehicle.
Tubular markers shall be a minimum of 700 mm (28 in) in height when they are used on freeways and other high-speed highways, on all highways during nighttime, or whenever more conspicuous guidance is needed.

Proposed CA Supplement Section 6F.60 text (Add proposed text in addition to the above MUTCD text):
Guidance:

Tubular markers should be a minimum of 1050 mm (42 in) in height.

Existing MUTCD Section 6F.60 text (Keep existing MUTCD text and add proposed CA Supp text):
Standard:
For nighttime use, tubular markers shall be retroreflectorized. Retroreflectorization of 700 mm (28 in) or larger tubular markers shall be provided by two 75 mm (3 in) wide white bands placed a maximum of 50 mm (2 in) from the top with a maximum of 150 mm (6 in) between the bands.

Proposed CA Supplement Section 6F.60 text (Add proposed text in addition to the above MUTCD text):
Guidance:
Retroreflectorization of tubular markers that are more than 1050 mm (42 in) in height should be provided with a single 300 mm (12 in) wide white band at night.

Recommendation #111 (IV.C.(1c))

Section 6F.61 Vertical Panels

Existing MUTCD Section 6F.61 text (Keep existing MUTCD text and add proposed CA Supp text):
Standard:
Vertical panels (see Figure 6F-7, Sheet 1 of 2) shall be 200 to 300 mm (8 to 12 in) in width and at least 600 mm (24 in) in height.

Proposed CA Supplement Section 6F.61 text (Add proposed text in addition to the above MUTCD text):
Guidance:
Vertical panels should be a minimum of 300 mm (12 in) in width.

Recommendation #113 (IV.C.(1e))

Section 6F.63 Type I, II, or III Barricades

Existing MUTCD Section 6F.63 text (Keep existing MUTCD text and add proposed CA Supp text):
Standard:
The minimum length for Type I and Type II Barricades shall be 600 mm (24 in), and the minimum length for Type III Barricades shall be 1200 mm (48 in). Each barricade rail shall be 200 to 300 mm (8 to 12 in) wide.

Proposed CA Supplement Section 6F.63 text (Add proposed text in addition to the above MUTCD text):
Guidance:
The minimum length for Type I and Type II Barricades should be 900 mm (36 in). Each barricade rail should be a minimum of 300 mm (12 in) wide.

Figure 6F-7. Channelizing Devices
Depending on the resolution to the above recommendations, if necessary, this figure will be revised accordingly and included in the CA Supplement.

Background:

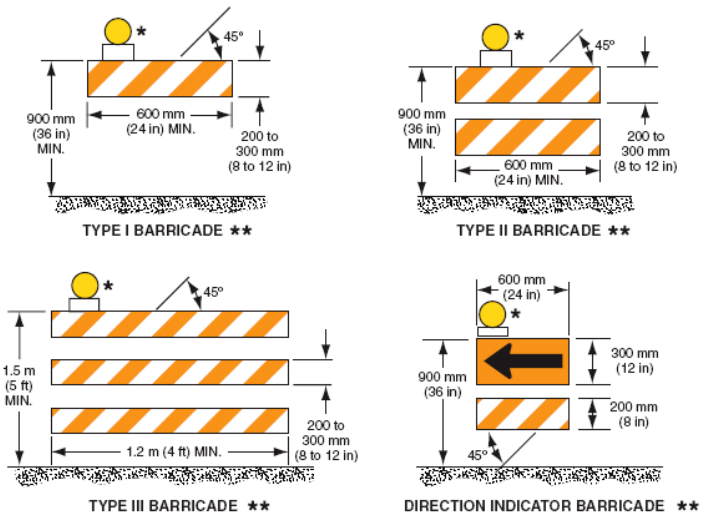
The following minimum dimensions or properties for channelizing devices used in highway work zones are recommended to accommodate the needs of older drivers:

- **Traffic cones—900 mm (36 in) high, with two bands of retroreflective material totaling at least 300-mm- [12-in-] wide for nighttime operations.**
- **Tubular markers—1050 mm (42 in) high, with a single band of retroreflective material at least 300-mm- [12-in-] wide for nighttime operations.**
- **Vertical (striped) panels—300 mm (12 in) wide.**
- **Barricades—300-mm x 900-mm (12-in x 36-in) minimum dimension.**

MUTCD 2003 Figure 6F-7 is adopted as-is by the CA Supplement

Page 6F-32 2003 Edition

Figure 6F-7. Channelizing Devices (Sheet 2 of 2)



* Warning lights (optional)
** Rail stripe widths shall be 150 mm (6 in), except that 100 mm (4 in) wide stripes may be used if rail lengths are less than 900 mm (36 in). The sides of barricades facing traffic shall have retroreflective rail faces.

Note: If barricades are used to channelize pedestrians, there shall be continuous detectable bottom and top rails with no gaps between individual barricades to be detectable to users of long canes. The bottom of the bottom rail shall be no higher than 150 mm (6 in) above the ground surface. The top of the top rail shall be no lower than 900 mm (36 in) above the ground surface.

Rationale

Channelization systems are used to direct motorists into the open lanes and to guide them through the work area. They must provide a long detection distance and be highly conspicuous under both day and night conditions. Humphreys, Maulden, and Sullivan (1979) identified the most significant problems with channelization in work zones as: (1) failure to use, or hazardous use of, temporary concrete barriers; and (2) inadequate or inconsistent use of devices and methods in closing roadways and establishing lane-closure tapers.

Diminished Capability

Older drivers show reduced sensitivity to contrast. A major problem at night is reduction in contrast sensitivity, which makes it difficult to see even large objects when they cannot be distinguished from their background. Olson (1988) pointed out that the brightness of a traffic control device is the main factor in its attention-getting capability: in a visually complex environment, the brightness must be increased by a factor of 10 to achieve conspicuity equivalent to that found in a low-complexity environment.

Older drivers also have difficulty processing information due to less effective scanning behavior and eye movements, diminished visual field size, difficulty in selective attention, and slower decision making. Inconsistent use of drums and traffic cones to delineate the travel path may be a particular problem for older drivers, especially when applied in the presence of remnants of old lane markings, because such inconsistency is confusing and older drivers (and inattentive drivers) are not able to react as quickly to conflicting traffic cues (National Transportation Safety Board, 1992

Finally, steering abilities may be adversely affected by physical problems such as arthritis.

Supporting Evidence

The primary way to increase the conspicuity of a TCD is to increase its size or the amount of retroreflective material on the device. A 1981 study evaluated the effectiveness of traffic cones and tubular markers, vertical panels, drums, barricades, and steady-burn lights in laboratory studies, in controlled field studies, and at actual construction sites. (Pain, McGee, and Knapp). Key results from the study were as follows.

Traffic cones -- 1) Bigger is better: 900-mm (36-in) cones are more effective than 700-mm (28-in) cones. 2) At night, the amount of highly retroreflective material in a 300- to 350-mm (12- to 14-in) collar is needed for effectiveness. 3) Under both day and night conditions, the 2-band configuration outperformed the 3-band configuration, and both outperformed the 1-band configuration.

Tubular Markers -- 1) During daytime, 700-mm and 1,050-mm (28-in and 42-in) tubular markers are as effective as cones. 2) At night, tubular markers with at least a 300-mm (12-in) highly retroreflective band are equally as effective as cones. 3) The 1-band configuration of retroreflective material outperformed the 2- and 3-band configurations for tubular markers.

Vertical panels -- 1) Vertical panels are equally as effective (detectable) as Type I barricades, and vertical panels promote earlier lane changing than barricades. 2) The minimum width dimensions of the panel should be 300 mm (12 in) rather than 200 mm (8 in), especially when used at night and on high-speed facilities.

Drums -- 1) Drums promote lane changing further upstream of the taper than other devices. (3) Drums are associated with a speed reduction.

Barricades -- 1) The Type I barricade is as effective as other devices. 2) The Type II barricade is no more detectable than the Type I barricade. 3) The 300-mm x 900-mm (12-in x 36-in) barricade is more conspicuous than the 200-mm x 600-mm (8-in x 24-in) barricade.

Relationship to Other Guides

MUTCD 2003 Sections 6F.59, 6F.60, 6F.61 and 6F.63 address the required dimensions for these devices. Currently, the Older Driver Handbook recommendations exceed the MUTCD minimum requirements for cones, tubular markers, vertical panels, and barricades. The recommendations for drums are the same.

Recommendation #115 (IV.C.(2))

Section 6F.58 Channelizing Devices

Existing MUTCD Section 6F.58 text (Delete existing MUTCD text and replace with proposed CA Supp text):

~~Guidance:~~

~~The spacing of channelizing devices should not exceed a distance in meters (feet) equal to 0.2 times the speed limit in km/h (1.0 times the speed limit in mph) when used for taper channelization, and a distance in meters (feet) equal to 0.4 times the speed limit in km/h (2.0 times the speed limit in mph) when used for tangent channelization.~~

Proposed CA Supplement Section 6F.58 text (Add proposed text in lieu of the above MUTCD text):

Guidance:

The spacing of channelizing devices should not exceed a distance in meters (feet) equal to 0.2 times the speed limit in km/h (1.0 times the speed limit in mph).

Where engineering judgment indicates a special need for speed reduction due to horizontal curvature or through the taper for a lane closure, the spacing of channelizing devices should not exceed a distance in meters (feet) equal to 0.1 times the speed limit in km/h (0.5 times the speed limit in mph).

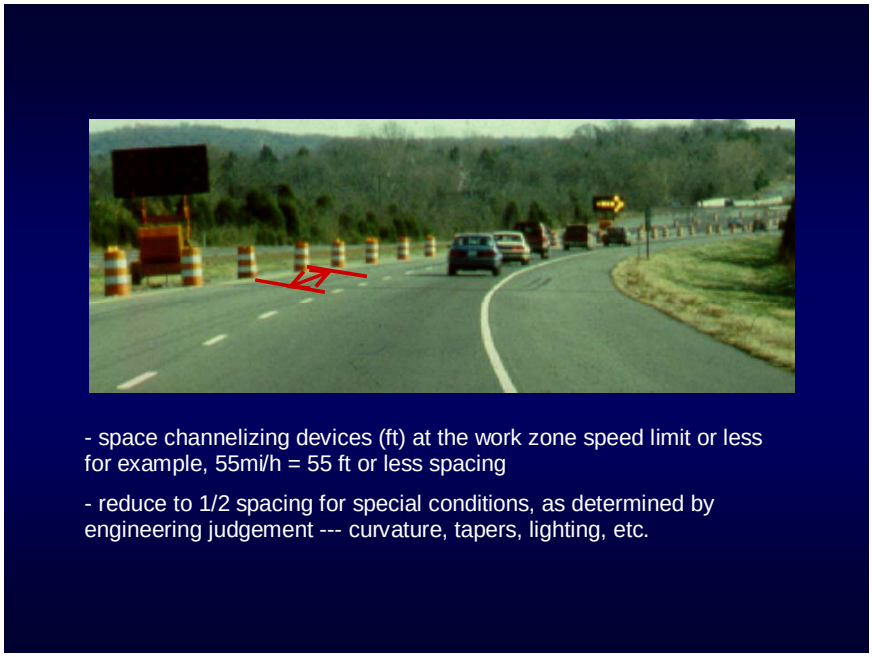
CA Supplement Table 6F-102 Maximum Spacing of Channelizing Devices

Depending on the resolution to the above recommendations, if necessary, this table will be revised accordingly and included in the CA Supplement.

Hypothetical Comparison:

Based upon a hypothetical speed limit of 40 mph, the MUTCD Section 6F.58 criteria recommends maximum channelizer spacing of 40 ft for tapers and 80 ft for tangents. The proposed Older Driver Handbook criteria for the same 40 mph speed limit recommends maximum spacing of 40 ft in all cases and based on engineering judgement indicating a special need, the maximum spacing be 20 ft.

Background:



It is recommended that channelizing devices through work zones (in non-crossover applications) be spaced at no more than a distance in feet equal to the speed limit through the work zone in miles per hour (e.g., in 40-mi/h work zone, channelizing devices should be spaced at no farther apart than 40 ft). Where engineering judgment indicates a special need for speed reduction where there is horizontal curvature or through the taper for a lane closure, spacing of channelizing devices at a distance in feet equal to no more than half of the speed limit in miles per hour is recommended (e.g., in a 40-mi/h zone, space the devices no farther apart than 20 ft).

Rationale

Channelization systems are used to direct motorists into the open lanes and to guide them through the work area. They must provide a long detection distance and be highly conspicuous under both day and night conditions. Humphreys, Maulden, and Sullivan (1979) identified the most significant problems with channelization in work zones as: (1) failure to use, or hazardous use of, temporary concrete barriers; and (2) inadequate or inconsistent use of devices and methods in closing roadways and establishing lane-closure tapers.

Diminished Capability

Older drivers show reduced sensitivity to contrast. A major problem at night is reduction in contrast sensitivity, which makes it difficult to see even large objects when they cannot be distinguished from their background. Olson (1988) pointed out that the brightness of a traffic control device is the main factor in its attention-getting capability: in a visually complex environment, the brightness must be increased by a factor of 10 to achieve conspicuity equivalent to that found in a low-complexity environment.

Older drivers also have difficulty processing information due to less effective scanning behavior and eye movements, diminished visual field size, difficulty in selective attention, and slower decision making. Inconsistent use of drums and traffic cones to delineate the travel path may be a particular problem for older drivers, especially when applied in the presence of remnants of old lane markings, because such inconsistency is confusing and older drivers (and inattentive drivers) are not able to react as quickly to conflicting traffic cues (National Transportation Safety Board, 1992

Finally, steering abilities may be adversely affected by physical problems such as arthritis.

Supporting Evidence

Pain et al. also evaluated the devices in terms of longitudinal spacing. Comparisons of regular speed-limit spacing (16.8 m [55 ft] in the test), half spacing (8.4 m [27.5 ft]), and double spacing (33.5 m [110 ft]) of Type I barricades and 200-mm x 600-mm (8-in x 24-in) panels showed that changes in spacing produced little impact on driver behavior. There were no significant speed or lateral placement differences between half, regular, and double speed-limit spacing during the day.

At night, however, when devices were placed at half spacing, they produced a speed reduction, apparently from the illusion that the motorist was going faster than he or she actually was. Devices placed at double spacing tended not to perform as well as when they were placed at regular speed-limit spacing, as drivers made lane changes and detected arrays of traffic control devices sooner with shorter spacings.

From these findings, Pain et al. recommended that:

1) All devices be placed at speed limit spacing for most conditions and, in all cases, along the taper or transition section;
2) If there is no construction work or hazard in the closed lane for a substantial length, or traffic delays, the spacing can be increased to no more than twice the speed limit; and
3) Shorter spacings may prove to be useful where speed reduction is desired.

Relationship to Other Guides

MUTCD 2003 Section 6F.58 addresses spacing of channelizing devices and recommends that the spacing should not exceed a distance in feet equal to the speed limit in mph when used for tapers or a distance in feet equal to twice the speed limit in mph when used on tangent sections.

These spacing parameters are twice to four times as long as what is recommended in the Older Driver Handbook.

Recommendation #116 (IV.C.(3))

Section 3D.03 Delineator Application
Section 6F.65 Temporary Traffic Barriers as Channelizing Devices
Section 6F.81 Temporary Traffic Barriers

Proposed CA Supplement Sections 3D.03, 6F.65 and 6F.81 text (Add new proposed text to existing MUTCD sections):
Guidance:

Side reflectors with cube-corner lenses or reflectors (facing the driver) should be mounted on top of concrete safety-shaped barriers and related temporary channelizing barriers at a distance in meters (feet) equal to 0.2 times the speed limit in km/h (1.0 times the speed limit in mph) spaced (in feet) at not more than the construction zone speed limit through a work zone.

CA Supplement Figure 3D-105 Examples of Median Barrier Delineation

This CA Supplement figure shows the use of delineators in a permanent application and does not specify the spacing. The spacing on barriers in TTC situation is not discussed in either the MUTCD or the CA Supplement Part 6.

Background

The use of side reflectors with cube-corner lenses or reflectors (facing the driver) mounted on top of concrete safety-shaped barriers and related temporary channelizing barriers is recommended, spaced (in feet) at not more than the construction zone speed limit (in miles per hour) through a work zone.

Rationale

Channelization systems are used to direct motorists into the open lanes and to guide them through the work area. They must provide a long detection distance and be highly conspicuous under both day and night conditions. Humphreys, Maulden, and Sullivan (1979) identified the most significant problems with channelization in work zones as: (1) failure to use, or hazardous use of, temporary concrete barriers; and (2) inadequate or inconsistent use of devices and methods in closing roadways and establishing lane-closure tapers.

Diminished Capability

Older drivers show reduced sensitivity to contrast. A major problem at night is reduction in contrast sensitivity, which makes it difficult to see even large objects when they cannot be distinguished from their background. Olson (1988) pointed out that the brightness of a traffic control device is the main factor in its attention-getting capability: in a visually complex environment, the brightness must be increased by a factor of 10 to achieve conspicuity equivalent to that found in a low-complexity environment.

Older drivers also have difficulty processing information due to less effective scanning behavior and eye movements, diminished visual field size, difficulty in selective attention, and slower decision making. Inconsistent use of drums and traffic cones to delineate the travel path may be a particular problem for older drivers, especially when applied in the presence of remnants of old lane markings, because such inconsistency is confusing and older drivers (and inattentive drivers) are not able to react as quickly to conflicting traffic cues (National Transportation Safety Board, 1992

Finally, steering abilities may be adversely affected by physical problems such as arthritis.

Supporting Evidence

In a study of concrete barrier visibility, Pain et al. (1981) found that retroreflectors were superior to retroreflectorized tape. Logically, the most conspicuous types of retroreflective devices, such as those containing cube-corner lenses, will be potentially the most effective in this regard.

Overall, Pain et al. (1981) concluded that most devices show relatively successful detection and path guidance performance. However, a major deterrent to effectiveness is not the device itself; instead, poor positioning, dirt, and overturned devices destroy the visual line or path created by the channelizing devices.

Therefore, although use of appropriate devices are important, of equal importance is conscientious set-up and care of channelizing devices used in the work zones.

Relationship to Other Guides

MUTCD Sections 6F.65 and 6F.81 address temporary traffic barriers. Both sections note that such barriers *shall* be supplemented with delineation, but does not specifically denote the type of delineation.

Recommendation #120 (IV.D.(4))

Section 6F.65 Temporary Traffic Barriers as Channelizing Devices
Section 6F.81 Temporary Traffic Barriers
Sections 6F.85 Screens
Section 6G.15 Two-Lane, Two-Way Traffic on One Roadway of a Normally Divided Highway
Section 6G.16 Crossovers
Notes for Figure 6H-39—Typical Application 39
Notes for Figure 6H-40—Typical Application 40
Notes for Figure 6H-41—Typical Application 41
Notes for Figure 6H-45—Typical Application 45

Proposed CA Supplement Sections 6F.65, 6F81, 6F.85 and 6G.16 text and Notes for TA-39, TA-40, TA-41 and TA-45 (Add new proposed text to existing MUTCD sections and TAs):

Guidance:

Plastic glare-control louvers (paddles) should be mounted on top of concrete channelizing barriers, when used in transition and crossover areas, at a spacing of not more than 600 mm (24 in) for TTC on high-volume roadways.

Background

It is recommended for construction/work zones on high-volume roadways that plastic glare-control louvers (paddles) be mounted on top of concrete channelizing barriers, when used in transition and crossover areas, at a spacing of not more than 600 mm (24 in).

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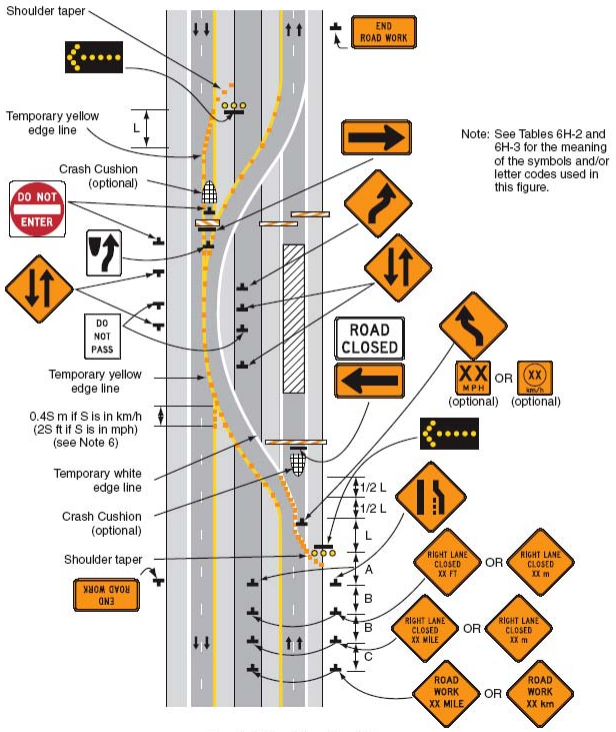
Figure 6H-39. Median Crossover on Freeway (TA-39)



Typical Application 39

Rationale

The conspicuity of concrete safety shaped barriers (CSSB's) is an important issue. Their composition provides little contrast with the roadway pavement, making them difficult to see at night, particularly in the rain, and under opposing headlight glare conditions. Proper barrier delineation treatments will provide drivers with a defined path during darkness and adverse weather conditions.

Diminished Capability

In addition to the items previously noted, older drivers' increased sensitivity to glare and reduced dark adaptation ability will compound the difficulties associated with maneuvering through a crossover or meeting oncoming traffic while driving at night.

Supporting Evidence

Several studies have examined the issue of delineation of CSSB's. The most recent and comprehensive was a 1988 effort by Ullman and Dudek. The study included five barrier delineation treatments, using observations of driver performance to determine how different delineator types, spacings, and mounting positions on the barrier affect nighttime traffic operating in the travel lane next to the barrier. An additional objective of the study was to determine how the visibility and brightness of different types of delineators deteriorate over time because of dirt and road film. The study authors recommended the use of cube-corner lenses for delineating CSSB's in narrow freeway median applications, because these delineators do not lose their reflectivity due to dirt and grime as quickly as those covered with high intensity sheeting. In addition, for situations with limited lateral clearance, as is common with TLTWO's, top-mounted delineation is recommended, because side-mounted close delineator spacing results in lane straddling if the barrier is located close to the travel lanes.

Although subjects indicated a preference for close spacings, driver performance data did not show any differences between 15.2-m (50-ft) and 61-m (200-ft) spacing. The authors recommended that a 61-m (200-ft) spacing be considered maximum, and that closer spacings may be necessary for CSSB's on sharp curves. The recommendations were also deemed appropriate for CSSB's in work zones.

The Pennsylvania Department of Transportation employed a paddle-type system for glare control in the late 1970's. The system consists of plastic airfoil-shaped paddles, which when mounted resembles a picket fence. Results of a 5-year study have shown that the paddle-type system reduces headlight glare satisfactorily and is more cost-effective, both in terms of installation and maintenance, than metal mesh screen. The system was also found to be beneficial as a temporary control for channelizing traffic around a construction work zone, when screening was placed at the transition or the taper zone at the ends of the work zone (Maurer, 1984).

Relationship to Other Guides

MUTCD 2003 Sections 6G.15 and 6G.16 address TLTWO on a normally divided highway and crossovers. MUTCD 2003 Sections 6F.65 and 6F.81 address the delineation of Temporary Traffic Barriers and note that such barriers *shall* be supplemented with standard delineation. Finally, the use of a "screen" for glare is addressed in section 6F.85.
Note, it was a maintenance problem that force PA to change from using a screen to glare paddles.